independently of the inconvenience that might result from the absorption of such large quantities of amylene, and the troublesome uncertainty the surgeon is kept in, respecting the return to consciousness of his patient, it is by no means proved that such resolution would ensue upon a multiplication of the doses. Moreover, the reporter's experiments would seem to show that such repetition, providing the dose be not rendered excessive, tends to destroy the activity of the agent; while, when resolution was obtained, it was only shortly before death.—*Bull. de Thérap.*, May, p. 443.

M. Velpeau, as a member of the Committee, observed that he was no great partisan of amylene, and does not think, so far as his own experience goes, that it is likely to displace chloroform. Against its employment are its detestable smell, alike annoying to operator and patient, the little constancy of its effects, and the necessity of employing an apparatus. As to chloroform, he believes that the amount of danger attending its use has been grossly exaggerated. During the ten years he has employed it in from 5 to 6,000 cases, for operations at different ages, and in both sexes, he has met with no accident whatever. No important accident has, indeed, occurred at any of the great Paris Hospitals. Moreover, how unjust, whenever a death occurs during or after an operation, to attribute it to chloroform! Employed with precautions, he does not regard it as a bit more dangerous than amylene, while it may be administered without any apparatus.

M. Giraldes, at a subsequent meeting of the Academy (*Gaz. Méd.*, No. 21), gave a further account of his experience, having used amylene in the cases of seventy-nine children, varying from one to fourteen years of age, two drachms being in most cases the quantity employed. The time required for the production of the anæsthesia is usually about three minutes, but it varies much, both in different persons and in the same individual. No ill consequence has resulted, the anæsthesia taking place without reaction, or convulsions. In eight cases, muscular rigidity was observed; and when this occurs, the inhalations should be suspended a while, and free respiration permitted. In six cases vomiting occurred. The anæsthesia lasted for a very short time, but it may continue for eight or ten minutes, and is easily kept up. Chloroform is a more powerful agent, but it is also a more dangerous one. It may throw feeble children into a state of cadaveric resolution; and the anæsthesia it induces is often so prolonged as to endanger life. On other occasions it induces spasmodic closure of the jaws, rigidity of the muscles of the neck and thorax, and all the symptoms of asphyxia, rendering artificial respiration necessary. It generally gives rise to vomiting, or other signs of irritation of the digestive organs. After the employment of amylene sensibility rapidly returns, and the children seem in nowise to suffer from it. It may be given soon after meals, and to enfeebled children, in whom chloroform would prove dangerous. It thus has, like chloroform, its special indications, and frequently presents indubitable advantages.

Dr. Kadlburger (*Wien Wochenschrift*, No. 19) relates the results of his experience of the employment of amylene in seventy-two cases of tooth-extraction, he applying it by means of a sponge to both mouth and nostrils. He states that the amylene he employs emits a smell of over-ripe pears, and is nowise irritating to the respiratory organs. From one to one and a half minute inhalation suffices for this purpose. The falling of the uplifted arm, as if wearied, is the signal for the discontinuance of the inhalation. No abnormal muscular movements, or closure of the jaw were produced. The patient readily opened the mouth upon being requested to do so; and during the extraction, most persons retained the consciousness of the application of the instruments. The pain, when felt at all, was very slight, and never at all approaching to the torture attendant upon ordinary tooth-drawing.

7. *Anæsthetic Action of Carbonic Oxide.*—Dr. Ozanam considers that the results hitherto obtained by the use of anæsthetic agents concur to demonstrate the truth of the law that the whole series of carbonized bodies, volatile or gaseous, are endowed with anæsthetic power, and that they possess this power

in proportion to the carbon which they contain. He has therefore undertaken some experiments with carbonic oxide, carbonic acid, and cyanogen, and the results observed with the first-named gas are detailed in the present memoir.

The carbonic oxide is obtained by the action of sulphuric acid, aided by heat, upon oxalic acid; when the latter is resolved into carbonic acid and carbonic oxide, and the carbonic acid is removed by lime-water, while the carbonic oxide remains in the gaseous state. The experiments and observations were thirty in number, of which twenty-five were on rabbits and five on man. The author divides the phenomena produced by the inhalation of carbonic oxide into four periods—viz: 1. The prodromic period; 2. The period of excitement; 3. The period of anæsthesia; 4. Death or restoration of sensibility.

A pipe connected with a bladder filled with carbonic oxide was introduced into the mouth of a well-fed rabbit, whose nostrils were closed; an assistant pressed upon the bladder, and the animal, forced to breathe by the mouth, inhaled the gas mixed with atmospheric air. During the first five or six inspirations the animal made no effort; it was motionless and astonished, as if under the impression of a danger which it suspected but did not know, and of which it did not yet feel the violent effects. But at the end of fifteen to thirty seconds this preliminary period was succeeded by a stage of excitement: the animal leaped and made efforts to escape; then these voluntary movements were succeeded by very strong convulsions, contractions, throwing the head backwards, trembling, &c. During this period the circulation was accelerated at first from fifteen to twenty pulsations under the influence of the convulsive agitation; then it returned to its normal rate, which it soon quitted and became slower. The respiration, on the contrary, offered from the beginning a marked tendency to become slower. To the convulsive state suddenly succeeded the period of collapse or stupor; all movement ceased, the body fell back like an inert mass, the head hung down, the eye was widely open, the pupil dilated, the sight almost abolished, the four members were paralyzed, the urine passed involuntarily, the pulsation of the heart became more slow; the respiration also was less frequent. If the inhalations are prolonged, the respiratory act is weakened still more; it occurs only about once in five or ten seconds, by a general and jerking effort, resembling hiccough; but, prolonged to this degree, the anæsthesia becomes dangerous, and it should be narrowly watched, for the inspiratory nerves are almost paralyzed, and the animal approaches the state of apparent death.

The experiments made and recorded by Dr. Ozanam prove beyond a doubt the anæsthetic action of the gas, and he regards it as more energetic in its action than chloroform, but less prolonged in its operation; its effects are rapid, violent, and transient, so that an animal may pass in a few minutes from the state of apparent death to a normal condition. On the other hand, it possesses certain advantages over chloroform, in the absence of a strong, or penetrating, or caustic smell—a circumstance which renders the gas easily respirable by every person; while ether, chloroform, and the carburets of hydrogen have all a penetrating smell, which renders them offensive to many persons, and they are caustic when applied to the skin. It is also easily measured, owing to its permanently gaseous condition, which is not the case with chloroform and ether: their volatility varies under the slightest influence, as the summer, the heat of a room, or the vicinity of a stove, will cause a patient to absorb double the quantity of the vapours which would have been breathed if the circumstances had been different. The anæsthetic operation of carbonic oxide terminates in recovery from insensibility, or in death. When the inhalations are discontinued, the animal is abandoned to itself. During one to three minutes the anæsthesia remains absolute, and the animal might be considered dead, if auscultation did not still reveal the weakened sounds of the heart, and some rare inspiratory efforts. The ordinary life soon recommences, respiration is re-established, and the heart progressively resumes its normal rate, and sometimes slightly exceeds it. But occasionally the passage from stupor or apparent death to real death is sudden, unexpected, and similar in this respect to sudden death by chloroform: the heart and respiration, already very slow in their actions, cease at once and forever.

In case of poisoning by carbonic oxide, the antidote most likely to prove serviceable is ammonia; and Dr. Ozanam details two cases of rabbits poisoned by carbonic oxide, which were restored by the application of the vapour of ammonia.—*Brit. and For. Med.-Chir. Review,* July, 1857, from *Archives Gén. de Méd.*, Feb. 1857.

8. *On the Effect produced on the Circulation by the Long-continued Action of Cold Water Externally.* By Dr. H. Bence Jones and W. Howship Dickinson, Esq.—Opportunities of making use of some douche and shower-baths of more than ordinary potency having presented themselves, the following experiments were undertaken, with a view of removing some of the uncertainty which now prevails regarding the effects of the outward application of cold water. These experiments are divided into three sections: 1st, on the general effect of the douche or shower-bath; 2dly, on the effect of the shower-bath at different temperatures; 3dly, on the effect of the shower-bath in different circumstances.

Section 1. The first experiment was made by a douche-bath, by which 225 gallons of water were allowed to fall upon the head for a quarter of an hour. By this the pulse was greatly relaxed in frequency and power, and it became irregular; at one period of the experiment the reduction amounted to 30 beats in the minute. The second experiment was made with a shower-bath delivering about 20 gallons of water a minute—upwards of 300 gallons in fifteen minutes. The results were similar to those obtained with the douche-bath, but were more marked. During the second minute, the pulse was found to be less frequent by 40 beats than it had been previous to the fall of water; and from the fifth minute to the fifteenth, when the experiment terminated, it was observed to be frequently intermitting and very weak. The third experiment was made with a still more powerful shower-bath, at Vienna. This delivered nearly 38 gallons of water a minute—upwards of 550 gallons in fifteen minutes; but the openings in the rose were very fine, and the shower was much spread. In the fourth minute the pulse was found to be imperceptible, and during the remainder of the quarter of an hour for which the bath was continued it was feeble and irregular. Afterwards the pulse was observed to be smaller and rather slower than it had been previously, but it was immediately restored by a warm bath. Thus it seems that a strong douche or shower-bath produces an excessive immediate effect upon the pulse. By the first shock it may be reduced in rate even 50 beats in the minute; it then recovers a little, but after four or five minutes, when the shivering commences, it again becomes reduced, and often is rendered quite imperceptible.

Section 2. The experiments in this section were made for the purpose of showing whether the effect varied with the temperature of the water. The most interesting are two which were made with the powerful shower-bath alluded to in Section 1, second experiment. In the first, the water was at 70° Fahrenheit. The pulse did not fall in rate for three minutes, although it lost much in strength and volume. When shivering commenced, at the end of the fourth minute, the pulse was imperceptible, and it was scarcely to be felt until the end of the sixth, and it remained weak and irregular until the termination of the experiment at the end of the tenth minute. In the second experiment the water was iced down to 50° F. The effect was much more rapid. During the first fifteen seconds the pulse was reduced at the rate of 38 beats per minute; this was followed by a reaction better marked than before, and the annihilation of the pulse, which followed the commencement of shivering, was much more complete and of longer duration.

Section 3. Some of the effects observed to follow the use of the shower-bath, taken under varying circumstances, are here stated. Two experiments were made: one at the baths at Ischel, in Austria, and one at the Prussian bath, at Vienna, where cold shower-baths were alternated with very hot vapour-baths. It was found that the increased action of the pulse produced by the exposure of the body to hot steam prevented that depression which would otherwise have resulted from the cold water. A converse experiment is quoted from Dr. Currie's "Medical Reports." An ague patient, who had derived advantage from the cold effusion during the hot stage of the fit, nearly died from the